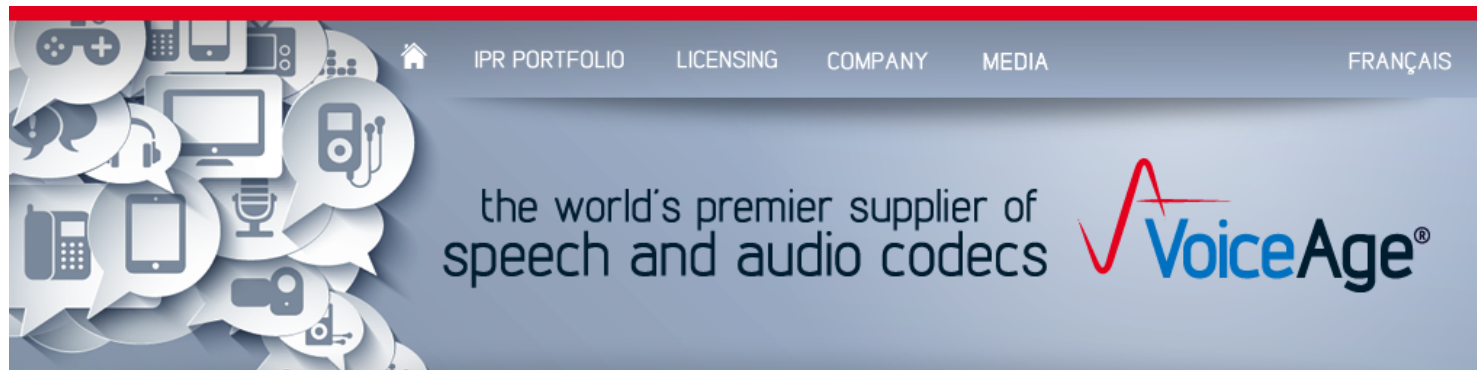


EXHIBIT D



AMR-WB/G.722.2

Market Momentum

[Orange launches world's first high definition voice service for mobile phone in Moldova](#)

[AMR-WB Deployment](#)

[GSMA – HD Voice](#)

[Global Momentum of Mobile HD Voice](#)

The increasing adoption of end-to-end digital networks such as the second and third generation wireless systems (2G and 3G) and voice over packet networks enables the use of wider speech bandwidth offering communication substantially superior to the quality of traditional telephony in intelligibility and naturalness and giving an experience that approaches face-to-face interaction.

AMR Wideband (AMR-WB) is the first codec to be standardized for both wireless (3GPP) and wireline (ITU-T Recommendation G.722.2) applications. It is also supported in the CableLabs® PacketCable™ 2.0 specification. It is therefore the ideal codec for wideband speech applications across converging wireline/wireless networks.

The AMR-WB speech codec utilizes the ACELP® (Algebraic Code Excited Linear Prediction) technology, which is also employed in the AMR narrowband and EFR speech codecs as well as in ITU-T G.729 and G.723.1 at 5.3 kbps. The AMR-WB speech codec consists of nine bit rates of 23.85, 23.05, 19.85, 18.25, 15.85, 14.25, 12.65, 8.85 and 6.6 kbps and includes VAD/DTX/CNG features for increased efficiency.

AMR-WB is the required codec in GSM and WCDMA networks for wideband speech and for multimedia services when wideband speech (with 16 kHz sampling frequency) is supported – including Multimedia Messaging Service (MMS), IMS Messaging and Presence services, Packet-Switched Streaming (PSS), Multimedia Broadcast/Multicast Service (MBMS) and Push-to-talk over Cellular (PoC). Other applications include VoIP, conferencing, Wi-Fi telephony, satellite telephony, video telephony, streaming audio over the internet, audio storage and playback, voicemail and store-and-forward messaging, chat and virtual reality immersion environments, multimedia real-time collaboration tools, digital radio broadcasting, archiving and distribution of narrative content, and network-based language-learning applications.

It also interoperates with VMR-WB, the latest 3GPP2 wideband speech standard, which is mandatory for cdma2000® wideband telephony and multimedia messaging services.

G.722.2/AMR-WB supports dynamic adaptation to network conditions, using lower bit rates during network congestion or degradation while preserving audio quality.

Technology

Encoded bandwidth	~ 50-7000 Hz
Standardized	ITU-T/3GPP 2002/2001
Coding type	ACELP® (Algebraic Code Excited Linear Prediction)
Bit rate	23.85/23.05/19.85/18.25/15.85/14.25/12.65/8.85/6.6 kbps
Delay (ms): Frame size Lookahead	20 5
Quality	Good speech performance at rates 12.65 kbps and higher 15.85 >= G.722 @ 56 23.05 >= G.722 @ 64

Licensing

[Overview](#)

[AMR-WB/G.722.2](#)

[AMR-NB \(AMR\)](#)

[EFR-GSM](#)

[EFR-TDMA](#)

[EFR-PDC](#)

[AMR-WB +
EVRC Family](#)

[EVRC](#)

[EVRC-B](#)

[EVRC-C](#)

[EVRC-D](#)

[EVRC-E](#)

[EVS](#)

[MPEG-4 CELP](#)

[MPEG-H](#)

[SMV](#)

[VMR-WB](#)

[USAC](#)

[xHE-AAC](#)

[G.729.1](#)

[G.711.1](#)

[Audio Samples](#)

Complexity: WMOPS RAM (words)	38 (including VAD/CNG processing) 5.3 K
VAD/DTX/CNG	Included

Applications

- Wideband telephony on converged wireless, wireline and Wi-Fi networks, VoIP, satellite telephony, Push to talk over Cellular, video telephony
- Conferencing
- Streaming audio over the Internet
- True-tones, ringtones
- Audio storage and playback
- Voicemail
- Media players
- Media servers
- Media gateways
- Content creation tools
- Store and forward messaging

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